

Chapter 22A – Steel

2001 CBC	PROPOSED ADOPTION	OSHDP		DSA-SS	Comments
		1	4		
	Adopt entire chapter without amendments				
	Adopt entire chapter with amendments listed below	X	X	X	
	Adopt only those sections listed below				
	2201A.1.1 CA	X	X	X	
	2201A.1.2 CA	X	X	X	
2205A.10.2 CA	2204A.1.1 CA	X	X	X	Relocated existing California Building Standards into IBC format
2205A.13 CA	2204A.1.2 CA	X	X	X	Relocated existing California Building Standards into IBC format
2205A.12 CA	2204A.2.2 CA	X	X	X	Relocated existing California Building Standards into IBC format
2209A.4 CA	2205A.1.1 CA	X	X	X	Relocated existing California Building Standards into IBC format
	2205A.2	X	X	X	
	2205A.3.1	X	X	X	
	2205A.4	X	X		
2211A.4	2205A.4.1.1.1 CA	X	X		Relocated existing California Building Standards into IBC format
2211A.5 CA	2205A.4.1.2 CA	X	X		Relocated existing California Building Standards into IBC format
2211A.6 CA	2205A.4.1.3 CA	X	X		Relocated existing California Building Standards into IBC format
2211A.7 CA	2205A.4.1.4 CA	X	X		Relocated existing California Building Standards into IBC format
2211A.9 CA	2205A.4.2.1 CA	X	X		Relocated existing California Building Standards into IBC format
2211A.1 CA	2205A.4.2.2 CA	X	X		Relocated existing California Building Standards into IBC format
2211A.10 CA	2205A.4.2.3 CA	X	X		Relocated existing California Building Standards into IBC format

2211A.12 CA	2205A.4.2.4 CA	X	X		Relocated existing California Building Standards into IBC format
	2205A.5	X	X		
	2206A.4	X	X	X	
2205A.7.1 CA	2206A.6 CA	X	X	X	Relocated existing California Building Standards into IBC format
2205A.4.1 CA	2209A.3 CA	X	X	X	Relocated existing California Building Standards into IBC format
	2210A.3	X	X	X	
2219A.2 CA	2210A.5 CA	X	X	X	Relocated existing California Building Standards into IBC format
	2210A.6	X	X	X	
	2211A CA			X	
2231 CA	2212A CA	X	X	X	Relocated existing California Building Standards into IBC format
2231A.2 CA	221A.2 CA	X	X	X	Relocated existing California Building Standards into IBC format
2231A.3 CA	2212A.3 CA	X	X	X	Relocated existing California Building Standards into IBC format
2231A.8 CA	2212A.5 2212A.4 CA	X	X	X	Relocated existing California Building Standards into IBC format

REPEAL OF EXISTING CALIFORNIA AMENDMENTS IN PART OR IN WHOLE THAT ARE NO LONGER NECESSARY AS FOLLOWS:

2001 CBC DIVISION I – GENERAL

~~2001 CBC SECTION 2202A – STANDARDS OF QUALITY:~~ Repeal all amendments in this section.

2001 CBC SECTION 2205A – DESIGN AND CONSTRUCTION PROVISIONS: Repeal all amendments in following subsections.

~~2205A.8, 2205A.8.1 and 2205A.10.1.~~

2001 CBC DIVISION II – DESIGN STANDARD FOR LOAD AND RESISTANCE FACTOR DESIGN SPECIFICATION FOR STRUCTURAL STEEL BUILDING

~~2001 CBC SECTION 2206A – ADOPTION:~~ Repeal all amendments in this section.

~~2001 CBC SECTION 2207A – AMENDMENTS:~~ Repeal all amendments in this section.

2001 CBC DIVISION III – DESIGN STANDARD FOR SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS, ALLOWABLE STRESS DESIGN

~~2001 CBC SECTION 2208A – ADOPTION:~~ Repeal all amendments in this section.

2001 CBC SECTION 2209A – AMENDMENTS: Repeal all amendment in the following subsection.

~~2209A.5~~

~~2001 CBC DIVISION IV – SEISMIC PROVISION FOR STRUCTURAL STEEL BUILDINGS:~~ Repeal all amendments in this Division.

~~2001 CBC DIVISION V – SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS FOR USE WITH ALLOWABLE STRESS DESIGN:~~ Repeal all amendments in this Division.

~~2001 CBC DIVISION VI – LOAD AND RESISTANCE FACTOR DESIGN FOR COLD FORMED STRUCTURAL STEEL MEMBERS:~~ Repeal all amendments in this Division.

~~2001 CBC DIVISION VII – SPECIFICICATION FOR DESIGN OF COLD FORMED STRUCTURAL STEEL MEMBERS:~~ Repeal all amendments in this Division.

~~2001 CBC DIVISION VIII – LATERAL RESISTANCE FOR STEEL STUD WALL SYSTEMS:~~ Repeal all amendments in this Division.

2001 CBC DIVISION XII – TESTING AND INSPECTION.

2001 CBC SECTION 2231A – GENERAL PROVISIONS: Repeal amendment in the following subsection.

~~2231A.7~~

2001 CBC TABLES – Repeal all amendments in following tables.

~~Tables 22A-VIII-A, 22A-VIII-B and 22A-VIII-C~~

EXPRESS TERMS

SECTION 2201A - GENERAL

2201A.1 Scope. The provisions of this chapter govern the quality, design, fabrication and erection of steel used structurally in buildings or structures.

2201A.1.1 Application. *The scope of application of Chapter 22A is as follows:*

- 1. Structures regulated by the Division of the State Architect-Structural Safety (DSA-SS), which include those applications listed in Section 109.2 These applications include public elementary and secondary schools, community colleges and state-owned or state-leased essential services buildings.*
- 2. Structures regulated by the Office of Statewide Health Planning and Development (OSHDP), which include those applications listed in Section 110.1, and 110.4. These applications include hospitals, skilled nursing facilities, intermediate care facilities and correctional treatment centers.*

Exception *[For OSHDP 2]: Single-story Type V skilled nursing or intermediate care facilities utilizing wood-frame or light-steel-frame construction as defined in Health and Safety Code Section 129725, which shall comply with CBC Chapter 22 and any applicable amendments therein*

2201A.1.2 Identification of amendments. *DSA - SS and OSHDP adopt this chapter and all amendments.*

Exception: *Amendments adopted by only one agency appear in this chapter preceded with the appropriate acronym of the adopting agency, as follows:*

- 1. Division of the State Architect - Structural Safety:*
***[DSA-SS]** - For applications listed in Section 109.2*
- 2. Office of Statewide Health Planning and Development:*

[OSHPD 1] - For applications listed in Section 110.1

[OSHPD 4] - For applications listed in Section 110.4

SECTION 2202A - DEFINITIONS

2202A.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meaning shown herein.

STEEL CONSTRUCTION, COLD-FORMED. That type of construction made up entirely or in part of steel structural members cold formed to shape from sheet or strip steel such as roof deck, floor and wall panels, studs, floor joists, roof joists and other structural elements.

STEEL JOIST. Any steel structural member of a building or structure made of hot-rolled or cold-formed solid or open-web sections, or riveted or welded bars, strip or sheet steel members, or slotted and expanded, or otherwise deformed rolled sections.

STEEL MEMBER, STRUCTURAL. Any steel structural member of a building or structure consisting of a rolled steel structural shape other than cold-formed steel, or steel joist members.

SECTION 2203A - IDENTIFICATION AND PROTECTION OF STEEL FOR STRUCTURAL PURPOSES

2203A.1 Identification. Steel furnished for structural load-carrying purposes shall be properly identified for conformity to the ordered grade in accordance with the specified ASTM standard or other specification and the provisions of this chapter. Steel that is not readily identifiable as to grade from marking and test records shall be tested to determine conformity to such standards.

2203A.2 Protection. Painting of structural steel shall comply with the requirements contained in AISC 360. Individual structural members and assembled panels of cold-formed steel construction, except where fabricated of approved corrosion-resistant steel or of steel having a corrosion-resistant or other approved coating, shall be protected against corrosion with an approved coat of paint, enamel or other approved protection.

SECTION 2204 A - CONNECTIONS

2204A.1 Welding. The details of design, workmanship and technique for welding, inspection of welding and qualification of welding operators shall conform to the requirements of the specifications listed in Sections 2205A, 2206A, 2207A, 2209A, and 2210A. Special inspection of welding shall be provided where required by Section 1704A.

2204A.1.1 *(Relocated from 2205A.10.2, 2001 CBC)* **Welded Splice.** No welded splices shall be made except those shown on approved plans.

2204A.1.2 *(Relocated from 2205A.13, 2001 CBC)* **Welded Shear Connectors.** When welded shear connectors are used for applications other than composite construction, such as for transfer of shear loads to ledgers, ~~drag-ties~~ collectors and diaphragm chord members, ~~the allowable shear loads shall be one third of the tabulated values.~~ the allowable shear strength or design shear strength as appropriate, shall be one third of available strength. For installations where connectors are applied through formed steel decks and are used for transfer of shear loads other than for composite construction, ~~the allowable shear loads~~ shear strength or design shear strength as appropriate shall be one third the ~~tabulated value~~ available strength multiplied by the appropriate reduction factor ~~given in Division IX~~ as required per Section 2206A.

Exceptions:

1. Where the required shear strength is determined using load combinations with overstrength factors per ASCE 7 Section 12.4.3.2, the connector shear strength need not be reduced to one third the available strength.
2. The allowable or design shear strength of welded connectors given in code evaluation reports for concrete over formed steel decks for purposes of transferring diaphragm shear may be used without reduction subject to the acceptance of the enforcement agency.

2204A.2 Bolting. The design, installation and inspection of bolts shall be in accordance with the requirements of the specifications listed in Sections 2205A, 2206A, 2209A, and 2210A. Special inspection of the installation of high-strength bolts shall be provided where required by Section 1704A.

2204A.2.1 Anchor rods. Anchor rods shall be set accurately to the pattern and dimensions called for on the plans. The protrusion of the threaded ends through the connected material shall be sufficient to fully engage the threads of the nuts, but shall not be greater than the length of the threads on the bolts.

2204A.2.2 (Relocated from 2205A.12, 2001 CBC) Column Base Plate. When shear and / or tensile forces are intended to be transferred between column base plates and anchor bolts, provision shall be made in the design to eliminate the effects of oversized holes permitted in base plates by Division I, Section 2205A.11 * * * AISC 360 by use of shear lugs and / or welded shear transfer plates or other means acceptable to the enforcement agency, when the oversized holes are larger than the anchor bolt by more than 1/8 inch (3.2 mm). When welded shear transfer plates and shear lugs or other means acceptable to the enforcement agency are not used, the anchor bolts shall be checked for the induced bending stresses in combination with the shear stresses. using Formula 12A-1 as follows:

$$f_v/F_v + f_b/F_b \leq 1.0 \quad (12A-1)$$

SECTION 2205A STRUCTURAL STEEL

2205A.1 General. The design, fabrication and erection of structural steel for buildings and structures shall be in accordance with AISC 360. Where required, the seismic design of steel structures shall be in accordance with the additional provisions of Section 2205A.2.

2205A.1.1 Modify AISC 360 Section J1.8 by adding the following:

~~(Relocated from 2209A.4, 2001 CBC) Bolts in Combination with Welds. In new work, A307 bolts or high-strength bolts used in bearing-type connections shall not be considered as sharing the stress in combinations with welds. The welds shall be made before the bolts are tensioned. Welds, if used, shall be provided to carry the entire stress in the connection. High-strength bolts proportioned for slip-critical connections may be considered as sharing the stress with the welds.~~

~~In making welding alterations to structures, existing rivets and high-strength bolts tightened to the requirements for slip-critical connections are permitted for carrying stresses resulting from loads present at the time of alteration, and the welding need be adequate to carry only the additional stress.~~

2205A.2 Seismic requirements for steel structures. The design of structural steel structures to resist seismic forces shall be in accordance with the provisions of Section 2205.2.1 or 2205A.2.2 for the appropriate seismic design category.

2205A.2.1 Seismic Design Category A, B or C. - Not permitted by OSHPD and DSA-SS. Structural steel structures assigned to Seismic Design Category A, B or C shall be of any construction permitted in Section 2205. An *R* factor as set forth in Section 12.2.1 of ASCE 7 for the appropriate steel system is permitted where the structure is designed and detailed in accordance with the provisions of AISC 341, Part I. Systems not detailed in accordance with the above shall use the *R* factor in Section 12.2.1 of ASCE 7 designated for "structural steel systems not specifically detailed for seismic resistance."

2205A.2.2 Seismic Design Category D, E or F. Structural steel structures assigned to Seismic Design Category D, E or F shall be designed and detailed in accordance with AISC 341, Part I irrespective of *R* values, unless approved otherwise by the enforcement agency.

2205A.3 Seismic requirements for composite construction. The design, construction and quality of composite steel and concrete components that resist seismic forces shall conform to the requirements of the AISC 360 and ACI 318. An *R* factor as set forth in Section 12.2.1 of ASCE 7 for the appropriate composite steel and concrete system is permitted where the structure is designed and detailed in accordance with the provisions of AISC 341, Part II. In Seismic Design Category B or above, the design of such systems shall conform to the requirements of AISC 341, Part II.

2205A.3.1 Seismic Design Categories D, E and F. Composite structures are permitted in Seismic Design Categories D, E and F, subject to the limitations in Section 12.2.1 of ASCE 7 and shall be considered as an alternative system, where substantiating evidence is provided to demonstrate that the proposed system will perform as intended by AISC 341, Part II. The substantiating evidence shall be subject to building official approval. Where composite elements or connections are required to sustain inelastic deformations, the substantiating evidence shall be based on cyclic testing.

2205A.4 [For OSHPD 1 & 4] MODIFICATIONS TO AISC 341

2205A.4.1 Part I, Structural Steel Building Provisions Modifications.

2205A.4.1.1 Part I, Section 9. Special Moment Frame (SMF) modifications

2205A.4.1.1.1 Part I, Section 9.2a. Requirements for Beam-to-Column Connections, Replace item (1) as follows.

(Relocated from 2211A.4, 2001 CBC) The connection shall be capable of sustaining an interstory drift angle of at least 0.04 radians and an inelastic rotation of 0.03 radians.

2205A.4.1.1.2 Part I, Section 9.2b(a). Use of SMF connections designed in accordance with ANSI / AISC 358 shall be as modified in Section 2205A.5

2205A.4.1.2 (Relocated from 2211A.5, 2001 CBC) Part I, Section 10. Intermediate Moment Frame (IMF) – Not permitted by OSHPD.

2205A.4.1.3 (Relocated from 2211A.6, 2001 CBC) Part I, Section 11. Ordinary Moment Frame (OMF) – Not permitted by OSHPD.

2205A.4.1.4 (Relocated from 2211A.7, 2001 CBC) Part I, Section 12. Special Truss Moment Frame (STMF) – Not permitted by OSHPD.

2205A.4.1.5 Part I, Section 13. Special Concentrically Braced Frames (SCBF) modifications

2205A.4.1.5.1 Part I, 13.2 Members, Add a new section as follows.

AISC 341, 13.2f. Member Types

The use of rectangular HSS are not permitted for bracing members, unless filled solid with cement grout having a minimum compressive strength of 3000 psi at 28 days. The effects of composite action in the filled composite brace shall be considered in the sectional properties of the system where it results in the more severe loading condition or detailing.

2205A.4.1.6 Part I, Section 14. Ordinary Concentrically Braced Frames (OCBF) - Not permitted by OSHPD.

2205A.4.1.7 Part I, Section 15. Eccentrically Braced Frames (EBF) modifications

AISC 341, Part I, 15.4 Link-to-Column Connections, Delete the Exception.

2205A.4.2 Appendix S, Qualifying Cyclic Tests of Beam-to-Column and Link-to-Column Connections modifications

2205A.4.2.1 S3. Definitions. Replace the definition of Inelastic Rotation with the following:

*(Relocated from 2211A.9.S3, 2001 CBC) **Inelastic Rotation:** The permanent or plastic portion of the rotation angle between a beam and the column, or between a Link and the column of the Test Specimen, measured in radians. The Inelastic Rotation shall be computed based upon an analysis of the Test Specimen deformations. Sources of Inelastic Rotation include yielding of members and connectors, yielding of connection elements and slip between members and connection elements. For beam-to-column moment connections in Special Moment Frames, the inelastic rotation is represented by the plastic chord rotation angle calculated as the plastic deflection of the beam or girder, at the center of its span divided by*

the distance between the center of the beam span and the centerline of the panel zone of the beam-column connection. For link-to-column connections in Eccentrically Braced Frames, inelastic rotation shall be computed based upon the assumption that inelastic action is concentrated at a single point located at the intersection of the centerline of the link with the face of the column.

2205A.4.2.2 Appendix S, S3. Definitions. Add the following:

(Relocated from 2211A.1, 2001 CBC) **Rapid Strength Deterioration:** A mode of behavior characterized by a sudden loss of strength. In a cyclic test with constant or increasing deformation amplitude, a loss of strength of more than 50% of the strength attained in the previous excursion in the same loading direction.

2205A.4.2.3 Appendix S, Section S5.2. Size of Members – Replace as follows:

(Relocated from 2211A.10, 2001 CBC) The size of the beam or Link used in the Test Specimen shall be within the following limits:

1. At least one of the test beams or Links shall be no less than 100% of the depth of the prototype beam or Link. For the remaining specimens, the depth of the test beam or Link shall be no less than 90 percent of the depth of the Prototype beam or Link.
2. At least one of the test beams or Links shall be no less than 100% of the weight per foot of the prototype beam or Link. For the remaining specimens, the weight per foot of the test beam or Link shall be no less than 75 percent of the weight per foot of the Prototype beam or Link.

The size of the column used in the test specimen shall properly represent the inelastic action in the column, as per the requirements in Section S5.1. In addition, the depth of the test column shall be no less than 90% of the depth of the prototype column.

Extrapolation beyond the limitations stated in this section shall be permitted subject to peer review and approval by the enforcement agency.

2205A.4.2.4 Appendix S, Section S10. Acceptance Criteria – Replace as follows:

(Relocated from 2211A.12, 2001 CBC) The test specimens must satisfy the strength, interstory drift angle, or link rotation angle, and inelastic rotation requirements of these provisions for the Special Moment Frame and Eccentrically Braced Frame connection as applicable. The test specimen must sustain the required interstory drift angle, or link rotation angle, and inelastic rotation for at least two complete loading cycles without exhibiting rapid strength deterioration.

2205A.4.3 Appendix T, Qualifying Cyclic Tests of Buckling-Restrained Braces modification

AISC 341, T5.3 Similarity of Brace Test Specimen and Prototype, Replace (2) with the following:

The axial yield strength of the steel core P_{vsc} of the brace prototype shall not be more than 20 percent above nor 50% less than that of the test specimen where both strengths are based on the core area, A_{sc} , multiplied by the yield strength as determined from a coupon test. In addition, the material of the test specimen shall be the same ASTM classification and grade as the prototype.

2205A.5 [For OSHPD 1 & 4] MODIFICATIONS TO AISC 358

2205A.5.1 2. Design Requirements, 2.1 Special and Intermediate Moment Frame Connection Types, Table 2-1 Prequalified Moment Connections modifications

The prequalification of Bolted Unstiffened Extended End Plate and Bolted Stiffened Extended End Plate connections in buildings is not permitted by OSHPD.

The prequalification of moment connections at orthogonal moment frames sharing common columns or moment connections attached to other than one side or two opposite sides of a column is not permitted by OSHPD.

2205A.5.2 5. Reduced Beam Section (RBS) Moment Connection modifications

AISC 358, 5.3.1.7 Lateral Bracing of Beam shall be provided as follows: Replace the Exception with the following:

Exception: For both systems, where the beam supports a concrete structural slab that is connected between the protected zones with welded shear connectors spaced a maximum of 12 in. (300 mm) on center, supplemental top and bottom flange bracing at the reduced section may be omitted, subject to the approval of the enforcement agency. The concrete structural slab for the purposes of lateral bracing of the beam shall have a minimum of 5-1/4 inches in total thickness including metal deck, where occurs, have a minimum compressive strength of 4000 psi at 28 days and contain 6x6-W4xW4 WWF or equal.

SECTION 2206A - STEEL JOISTS

2206A.1 General. The design, manufacture and use of open web steel joists and joist girders shall be in accordance with one of the following Steel Joist Institute (SJI) specifications:

1. SJI K-1.1
2. SJI LH / DLH-1.1
3. SJI JG-1.1

Where required, the seismic design of buildings shall be in accordance with the additional provisions of Section 2205A.2 or 2210A.5.

2206A.2 Design. The registered design professional shall indicate on the construction documents the steel joist and / or steel joist girder designations from the specifications listed in Section 2206A.1 and shall indicate the requirements for joist and joist girder design, layout, end supports, anchorage, non-SJI standard bridging, bridging termination connections and bearing connection design to resist uplift and lateral loads. These documents shall indicate special requirements as follows:

1. Special loads including:
 - 1.1. Concentrated loads;
 - 1.2. Nonuniform loads;
 - 1.3. Net uplift loads;
 - 1.4. Axial loads;
 - 1.5. End moments; and
 - 1.6. Connection forces.
2. Special considerations including:
 - 2.1. Profiles for nonstandard joist and joist girder configurations (standard joist and joist girder configurations are as indicated in the SJI catalog);
 - 2.2. Oversized or other nonstandard web openings; and
 - 2.3. Extended ends.
3. Deflection criteria for live and total loads for non-SJI standard joists.

2206A.3 Calculations. The steel joist and joist girder manufacturer shall design the steel joists and / or steel joist girders in accordance with the current SJI specifications and load tables to support the load requirements of Section 2206A.2. The registered design professional may require submission of the steel joist and joist girder calculations as prepared by a registered design professional responsible for the product design. If requested by the registered design professional, the steel joist manufacturer shall submit design calculations with a cover letter bearing the seal and signature of the joist manufacturer's registered design professional. In addition to standard calculations under this seal and signature, submittal of the following shall be included:

1. Non-SJI standard bridging details (e.g. for cantilevered conditions, net uplift, etc.).
2. Connection details for:
 - 2.1. Non-SJI standard connections (e.g. flush-framed or framed connections),
 - 2.2. Field splices, and
 - 2.3. Joist headers.

2206A.4 Steel joist drawings. Steel joist placement plans shall be provided to show the steel joist products as specified on the construction documents and are to be utilized for field installation in accordance with specific project requirements as stated in Section 2206A.2. Steel placement plans shall include, at a minimum, the following:

1. Listing of all applicable loads as stated in Section 2206A.2 and used in the design of the steel joists and joist girders as specified in the construction documents.
2. Profiles for nonstandard joist and joist girder configurations (standard joist and joist girder configurations are as indicated in the SJI catalog).
3. Connection requirements for:
 - 3.1. Joist supports;
 - 3.2. Joist girder supports;
 - 3.3. Field splices; and
 - 3.4. Bridging attachments.
4. Deflection criteria for live and total loads for non-SJI standard joists.
5. Size, location and connections for all bridging.
6. Joist headers.

Design Approval. *Joist and joist girder design calculations and profiles with member sizes and connection details, and joist placement plans shall be provided to the enforcement agency and approved prior to joist fabrication, in accordance with Title 24, Part 1. Joist and joist girder design calculations and profiles with member sizes and connection details shall bear the signature and stamp or seal of the registered engineer or licensed architect responsible for the joist design. Alterations to the approved joist and joist girder design calculations and profiles with member sizes and connection details, or to fabricated joists are subject to the approval of the enforcement agency.*

~~Steel joist placement plans do not require the seal and signature of the joist manufacturer's registered design professional.~~

2206A.5 Certification. At completion of fabrication, the steel joist manufacturer shall submit a certificate of compliance in accordance with Section 1704A.2.2 stating that work was performed in accordance with approved construction documents and with SJI standard specifications.

2206A.6 *(Relocated from 2205A.7.1, 2001 CBC) Materials for fabricated joists shall be tested in accordance with Section 2231A. The material, design, manufacture and use of steel joists shall conform to the requirements of this chapter and to Division IX, except delete Division IX Sections 4.6 (b), 4.6(e), 103.8 (b),*

~~and 1003.8 (b) and use Division XII Section 2231A for design verification tests for all joists included in Division IX.~~

Joist Chord Bracing. The chords of all joists shall be laterally supported at all points where the chords change direction.

SECTION 2207A - STEEL CABLE STRUCTURES

2207A.1 General. The design, fabrication and erection including related connections, and protective coatings of steel cables for buildings shall be in accordance with ASCE 19.

2207A.2 Seismic requirements for steel cable. The design strength of steel cables shall be determined by the provisions of ASCE 19 except as modified by these provisions.

1. A load factor of 1.1 shall be applied to the prestress force included in T_3 and T_4 as defined in Section 3.12.
2. In Section 3.2.1, Item (c) shall be replaced with "1.5 T_3 " and Item (d) shall be replaced with "1.5 T_4 ."

SECTION 2208A STEEL STORAGE RACKS

2208A.1 Storage racks. The design, testing and utilization of industrial steel storage racks shall be in accordance with the *RMI Specification for the Design, Testing and Utilization of Industrial Steel Storage Racks*. Racks in the scope of this specification include industrial pallet racks, movable shelf racks and stacker racks and does not apply to other types of racks, such as drive-in and drive-through racks, cantilever racks, portable racks or rack buildings. Where required, the seismic design of storage racks shall be in accordance with the provisions of Section 15.5.3 of ASCE 7.

SECTION 2209A - COLD-FORMED STEEL

2209A.1 General. The design of cold-formed carbon and low-alloy steel structural members shall be in accordance with AISI-NAS. The design of cold-formed stainless-steel structural members shall be in accordance with ASCE 8. Cold-formed steel light-framed construction shall comply with Section 2210A.

2209A.2 Composite slabs on steel decks. Composite slabs of concrete and steel deck shall be designed and constructed in accordance with ASCE 3.

2209A.3 (Relocated from 2205A.4.1, 2001 CBC) Steel Deck Diaphragms. ~~Steel deck diaphragms shall comply with the requirements of this section and Section 4613A-1604A. Materials for steel deck diaphragms shall conform to the requirements of Division VII and shall be identified in accordance with Section 2203A.3. Unidentified steel shall be tested in accordance with Section 2203A.1. The design of the diaphragm as well as the construction details may be based on test information acceptable to the enforcement agency. Steel deck and concrete-filled steel deck diaphragms that is tested per ICC-ES AC 43 shall be considered to meet the requirements of this section.~~

Diaphragm chord forces both compression and tension forces resulting from in-plane shear shall be resisted by flange members and not by the steel deck diaphragm.

The base material thickness of steel deck for diaphragms shall not be less than 0.0359 inch (0.9 mm) (20 gage), unless tests acceptable to the enforcement agency have been performed.

~~*Weld washers shall be used for steel decks with a base metal thickness of material greater than 0.028 inch (0.7 mm) when the allowable shear values used in the diaphragm are obtained from the result of tests using weld washers.*~~

Welding inspection shall conform to Section 2231A, Division XII 2204A.1.

SECTION 2210A - COLD-FORMED STEEL LIGHT-FRAMED CONSTRUCTION

2210A.1 General. The design, installation and construction of cold-formed carbon or low-alloy steel, structural and nonstructural steel framing shall be in accordance with AISI-General and AISI-NAS.

2210A.2 Headers. The design and installation of cold-formed steel box headers, back-to-back headers and single and double L-headers used in single-span conditions for load-carrying purposes shall be in accordance with AISI-Header,

subject to the limitations therein.

2210A.3 Trusses. The design, quality assurance, installation and testing of cold-formed steel trusses shall be in accordance with AISI-Truss, subject to the limitations therein.

Complete engineering analysis and truss design drawings shall accompany the construction documents submitted to the enforcement agency for approval. When load testing is required per Section G of AISI-Truss, the test report shall be submitted with the truss design drawings and engineering analysis to the enforcement agency.

2210A.4 Wall stud design. The design and installation of cold-formed steel studs for structural and nonstructural walls shall be in accordance with AISI-WSD. Cold formed steel stud foundation plates or sills shall be bolted or fastened to the foundation or foundation wall in accordance with Section 2304.3.4, Item 2.

2210A.5 Lateral design. The design of light-framed cold-formed steel walls and diaphragms to resist wind and seismic loads shall be in accordance with AISI-Lateral.

(Relocated from 2219A.2, 2001 CBC) Shear wall assemblies per Section C2.2.3 of AISI-Lateral are not permitted within the seismic force-resisting system of buildings or structures assigned to Occupancy Category II, III, IV, or buildings designed to be relocatable.

2210A.6 Prescriptive framing. Not permitted by OSHPD and DSA-SS. Detached one- and two-family dwellings and townhouses, up to two stories in height, shall be permitted to be constructed in accordance with AISI-PM, subject to the limitations therein.

SECTION 2211A - [FOR DSA-SS] LIGHT MODULAR STEEL MOMENT FRAMES FOR PUBLIC ELEMENTARY AND SECONDARY SCHOOLS, AND COMMUNITY COLLEGES

2211A.1 General

2211A.1.1 Configuration. Light Modular Steel Moment Frame buildings shall be constructed of factory-assembled modules comprising a single story moment-resisting space frame supporting a floor and roof. Individual modules shall not exceed a width of 14 feet (4.25 meters) nor a length of 72 feet (22 meters). All connections of beams to corner columns shall be designed as moment-resisting in accordance with the criteria of Section 2211A.2.3. Modules may be stacked to form multi-story structures not exceeding 35 feet or two stories in height. When stacked modules are evaluated separately, seismic forces on each module shall be distributed in accordance with Section 12.8.3 of ASCE 7, considering the modules in the stacked condition. See 2211A.2.5 of this code.

2211A.1.2. Design, fabrication and erection. The design, fabrication and erection of Light Modular Steel Moment Frame buildings shall be in accordance with the AISC Specification for Structural Steel Buildings (ANSI/AISC 360) and the AISI North American Specification for the Design of Cold Formed Structural Members (AISI/COC/NASPEC) as applicable, and the requirements of this section. The maximum dead load of the roof and elevated floor shall not exceed 25 psf and 50 psf respectively. The maximum dead load of the exterior walls shall not exceed 45 psf.

2211A.2 Seismic requirements. In addition to the other requirements of this code, the design, materials and workmanship of Light Modular Steel Moment Frames shall comply with the requirements of this section. The response modification coefficient, R , shall be equal to $3\frac{1}{2}$. C_d and Ω_0 shall be equal to 3.0.

2211A.2.1 Base Materials. Beams, columns, and connection materials shall be limited to those materials permitted under the AISC Specification for Structural members (ANSI/AISC 360) and the AISI North American Specification for the Design of Cold Formed Structural members (AISI/COC/NASPEC).

2211A.2.2 Beam to Column Strength Ratio. At each moment-resisting connection the following shall apply:

$$\frac{\sum S_{bi} F_{ybi}}{\sum S_{cj} F_{ycj}} \geq 1.4$$

where:

F_{ybi} is the specified yield stress of beam "i"

F_{ycj} is the specified yield stress of column "j"

S_{bi} is the flexural section modulus of each beam "i" that is moment connected to the column "j" at the connection

S_{cj} is the flexural section modulus of each column "j" that is moment connected to the beam "i" at the connection

Exceptions:

1. Beam-column connections at the floor level beams of first or second-story modules need not comply with this requirement.
2. Beam-to-column strength ratios less than 1.4 are allowed if proven to be acceptable by analysis or testing.

2211A.2.3 Welding. Weld filler metals shall be capable of producing weld metal with a minimum Charpy V-Notch toughness of 20 ft-lbs at 0°F. Where beam bottom flanges attach to columns with complete joint penetration groove welds and weld backing is used at the bottom surface of the beam flange, such backing shall be removed and the root pass back-gouged, repaired and reinforced with a minimum 3/16" (5mm) fillet weld.

2211A.2.4 Connection Design. Connections of beams to columns shall have the design strength to resist the maximum seismic load effect, E_m , calculated in accordance with Section 12.4.3 of ASCE 7.

2211A.2.5 Multi-story assemblies. Analysis of multi-story assemblies shall be permitted to consider the stacked modules as a single assembly, with restraint conditions between the stacked units that represent the actual method of attachment. Alternatively, it shall be permitted to analyze the individual modules of stacked assemblies independently, with lateral and vertical reactions from modules above applied as concentrated loads at the top of the supporting module.

SECTION 2212A - TESTING

2212A.1 (Relocated from 2231A.1, 2001 CBC) Tests of Structural Steel. All steel used for structural purposes shall be identified as required by Section 2203A.1. Manufacturer's mill analyses and test reports are acceptable for properly identified steel, but the enforcement agency may require additional testing to determine the quality of the steel if there is any doubt as to its acceptability. Any steel not properly identified shall be tested to meet the minimum chemical and mechanical requirements of the ASTM standard appropriate for the steel specified for the structure.

EXCEPTION: No mechanical tests are required for unidentified steel when the minimum yield stress required by the design is less than or equal to 25 ksi (172 MPa) and the steel is not part of the designated lateral-force-resisting system.

2212A.2 (Relocated from 2231A.2, 2001 CBC) Tests of High-strength Bolts, Nuts and Washers. High-strength bolts, nuts and washers shall be sampled and tested by an approved independent testing laboratory for conformance with the requirements of ~~Division III~~ Section 2205A.

2212A.3 (Relocated from 2231A.3, 2001 CBC) Tests of End-welded Studs. End-welded studs shall be sampled and tested ~~and inspected~~ per the requirements of the ~~Structural Welding Code Steel, 1998 edition, published by the American Welding Society.~~ AWS D1.1.

2212A.4 (Relocated from 2231A.8, CBC 2001) Tests of Beam to Column Moment Connections. When testing is required in these provisions for beam-to-column moment connections in moment frames and link-to-column connections in eccentric braced frames, it shall meet the requirements of ~~Appendix S Qualifying Cyclic Tests of Beam and Link to Column Connections as part of the Seismic Provisions for Structural Steel Buildings, April 15, 1997, published by the American Institute of Steel Construction, 1 East Wacker Drive, Suite 3100, Chicago, IL 60601, including Supplement No. 1 dated February 15, 1999, with the amendments of Section 2211A.~~ AISC – 341 Appendix S as modified in Section 2205A.

Notation [For DSA-SS]:

Authority: Education Code Sections 17310, 81142; Health & Safety Code Section 16022

Reference(s): Education Code Sections 17280 - 17317, and 811130 - 81149; Health & Safety Code Sections 16000 – 16023

Notation [For OSHPD]:

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275, 129850 and 129790